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19 April 1993

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*W. A. Lamb*

WILLIAM A. LAMB, Captain, USAF  
Nuclear Weapons Concepts Division  
HPRF Phase 2 Study Director

1 Atch  
High Power Radio Frequency  
(HPRF) Phase 2 Study, Meeting  
#4 Minutes (U), OAS-MM-93-1,  
18 Mar 93, (S-RD-CNWDI-NF-WN)

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# High Power Radio Frequency (HPRF) Phase 2 Study

## Meeting #4 Minutes (U)

18 March 1993



**Captain William A. Lamb**

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Meeting #4 Minutes (U)

18 March 1993

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## (U) ACKNOWLEDGMENTS

(U) I would like to take this opportunity to thank Dr. Joe Sefcik of Lawrence Livermore National Laboratory, Livermore, California, who hosted the third meeting of the HPRF phase 2 Study. Additionally, Ms Jennifer Petersen, also of Lawrence Livermore National Laboratory was a great help during the meeting. Their efforts prior to and during the meeting helped immensely and were appreciated by all in attendance.

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(U) INTRODUCTION

(U) The Nuclear Weapons Concept Division of the Office of Aerospace Studies (OAS/XRN) conducted meeting #4 for the High Power Radio Frequency (HPRF) Phase 2 Study on 16-18 March 1993. The meeting was held at Lawrence Livermore National Laboratory in Livermore, California. The purpose of the meeting was to convene working groups, review working group progress, and update the program status. The individual working groups met during the first two days of the meeting. A general session was held on the final day. The agenda for the general session is contained in appendix A.

(U) These meeting minutes document meeting #4 and include copies of presentations. Additionally, a list of attendees is provided in appendix B. The meeting highlights are presented in the following sections.

(U) The issues discussed during the meeting dealt with the progress of the working groups, funding aspects of phase 2 work, information requirements for warhead design and system engineering work. The study director requested that each working group chair provide milestone statements. The warhead design work will continue, with the final design decision coming after more information becomes available with the optional tradeoffs. The options for engineering will continue until the configuration of the warhead and its employment are decided

(U) CLASSIFICATION AND SECURITY

(S-RD) The study director, Capt Lamb, presented an overview of the classifications involved in the HPRF Phase 2 Study. Specifically, each individual involved in this study needs to be aware of the proper classification of the materials generated or produced. The classification guides for this study are listed on the front of this report.

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DTRA  
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HIGH  
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**APPENDIX A**  
**(U) MEETING AGENDA**

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High Power Radio Frequency Phase 2 Study



## Agenda - March 18, 1993

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**APPENDIX B**  
**(U) MEETING ATTENDANCE LIST**

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APPENDIX C

(U) SURETY WORKING GROUP

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DOE FORM 1  
(4-89)

United States Government

Department of Energy

## memorandum

DATE: April 19, 1990

REF ID: A77827  
ATTN: DP-20.1

SUBJECT: Transmittal of Department of Energy (DOE) Use Control Policy

TO: Distribution:

The Department of Energy Use Control Policy has been approved by the Principal Deputy Assistant Secretary for Defense Programs. It is transmitted herewith for your information and action as appropriate. Further distribution within your organizations is authorized and encouraged.

Note the requirement for an annual Assistant Secretary for Defense Programs review of the effectiveness of the DOE system for protecting both nuclear weapons and nuclear explosive devices against deliberate unauthorized use. The Deputy Assistant Secretary for Military Application chartered Nuclear Command and Control Steering Group will coordinate this annual review with assistance and input from Operations Offices, National Laboratories, and the Use Control Effectiveness Committee.



for James M. Turner  
Associate Director for  
for Weapon Safety  
Office of the Deputy Assistant Secretary  
for Military Application  
Defense Programs

Attachment

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**SUBJECT: DEPARTMENT OF ENERGY (DOE) USE CONTROL POLICY--PROTECTION OF NUCLEAR WEAPONS AND NUCLEAR EXPLOSIVE DEVICES AGAINST DELIBERATE UNAUTHORIZED USE**

- References:**
1. National Security Decision Directive (NSDD), United States Nuclear Weapons Command and Control (TS), August 21, 1987
  2. NSDD, Nuclear Weapons Safety, Security and Control, (C), June 27, 1988
  3. Memorandum of Understanding, Department of Defense (DOD)/DOE Objectives and Responsibilities for Joint Nuclear Weapon Activities, January 17, 1983

1. **PURPOSE.** The purpose of this document is twofold:
  - a. To establish the DOE policy regarding protection against the deliberate unauthorized use of nuclear weapons and nuclear explosive devices (NEDs) while in DOE's custody.
  - b. Consistent with the joint agency responsibilities specified in the references, it is the DOE's purpose to strengthen dual-agency, high-level oversight and attention to the control of nuclear weapons.
2. **SCOPE.** The provisions of this policy apply to all Departmental elements and all contractors and subcontractors performing work for or as a part of the Department's Defense Programs.
3. **POLICY.**
  - a. An integrated system of positive measures shall be developed, implemented, and maintained to protect all nuclear weapons and NEDs in the custody of the DOE against deliberate unauthorized use. This system will include:
    - (1) Physical security measures to preclude unauthorized access to nuclear weapons or NEDs.
    - (2) Personnel assurance programs to assure the reliability of those DOE and contractor employees requiring authorized access to nuclear weapons or NEDs.
    - (3) Use control measures to deter or delay unauthorized acts by anyone who gains access to nuclear weapons. To the maximum extent possible, use control measures shall include positive design features. These positive design features should be incorporated at the earliest feasible point in the assembly of a nuclear weapon and be removed at the latest feasible point in the disassembly of a nuclear weapon.

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- (4) Methods to assure the timely recapture or recovery of nuclear weapons or NEDs in the event physical control is lost.
- b. The DOE shall conduct research and development on a broad range of security and control methods and devices for nuclear weapons.
  - c. Pursuant to the responsibilities identified in the references, the DOE will assist and coordinate with the DOD and other Federal agencies to provide protection against deliberate unauthorized use for all United States nuclear weapons throughout their life cycle.
  - d. The DOE shall assist the DOD in designating critical nuclear command and control equipment and components and ensuring that these items are developed to meet the criteria designated in the reference directives.
4. APPLICABILITY. This policy applies to all Defense Programs nuclear weapon developments and modifications unless there are compelling reasons to the contrary which are approved by the Assistant Secretary for Defense Programs.
5. TERMS EXPLAINED.
- a. Access. Close physical proximity to a nuclear explosive in such a manner as to allow the opportunity to tamper with or damage a nuclear explosive.
  - b. Nuclear Explosive Device. Any assembly or subassembly containing fissionable or fissionable and fusionable material and high explosives capable of producing a nuclear yield.
  - c. Nuclear Weapon. A nuclear explosive that is configured for operational use as part of the war reserve stockpile.
  - d. Use Control Measures. Systems, devices, removable components, and procedures which allow timely authorized use of a nuclear weapon while precluding or delaying unauthorized nuclear detonation. These measures are in addition to physical access controls which always apply to nuclear weapons.
6. OBJECTIVES.
- a. Positive measures to protect against deliberate unauthorized use:
    - (1) must be operable throughout the entire life cycle (production, transport, storage, deployment, maintenance, and retirement) of the nuclear weapon.
    - (2) should assist in providing to the principal nuclear command and control decision makers a secure, flexible nuclear response capability throughout the entire spectrum of peacetime, exercise and training, crisis, conventional and nuclear war, transition,

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termination, and postwar periods.

(3) should allow timely authorized use of nuclear weapons by the nuclear forces when and as directed by the President.

b. Positive measures to protect against deliberate unauthorized use must not significantly adversely affect the safety, security, operational reliability, survivability, or availability of nuclear weapons.

7. **REVIEW.** The Assistant Secretary for Defense Programs will annually review the DOE integrated system for protecting nuclear weapons and NEDs against deliberate unauthorized use to assure their effectiveness against current and emerging threats.



Victor Stello, Jr.  
Principal Deputy  
Assistant Secretary  
for Defense Programs

April 16, 1990  
Date

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APPENDIX D  
(U) SYSTEM ENGINEERING WORKING GROUP

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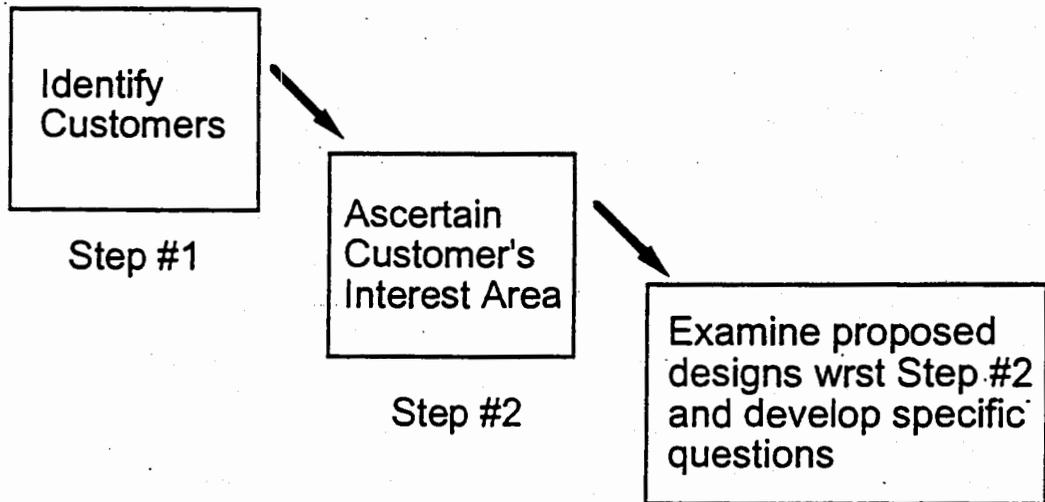


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*SEWG will use the "customer-supplier" model for identifying technical issues. (U)*

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Step #3

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HPRF Phase 2 Meeting #4 Issues/Action Items



Nuclear Safety Issues	Assumption	Design Impact	A.I. Owner
A. Level of Safety	Current modern safety theme, independent of Mk 12A or 21. Politically unacceptable to SNL otherwise. DOI not required.	Major impact. Exclusive region redefinition, intent, and trajectory inputs required.	
B. Intent Safety Subsystem	Controller in missile launch ctrl system commands WH via hard lines in msl that does not now exist. Assume will be available.		
C. Trajectory Safety Subsystem	MGC replaces ESSG to provide required USG signal to programmer during 3 stages of flight. Assume lines will be available, which do not now exist.		

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HPRF Phase II Study

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*Warhead Layouts*

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Manuel Martinez  
Los Alamos National Lab  
Los Alamos, NM

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# Project Plan for SEWG

	March '93			April '93			May '93		
Major Design Questions	△ 3/31								
Safety Theme				△ 4/5					
Integration Issues				△ 4/5 DOE	△ 4/19 BMC	△ 5/3 ALC			△ 5/24 Final Answers

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HPRF SEWG Meeting - 3/16/93

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Jim Schulze	SNL/NM, 5161	(505) 844-4706
Cliff DeJong	Kaman	(719) 599-1932
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Lt Col Dave Perella	FCDNA/FCFA	(505) 846-8885
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Capt Dave Sanders	BMO/CYRR	(909) 382-2231
Don Shover	TRW	(909) 382-6461
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Charles T. S. Chow	LLNL	(510) 422-4639

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APPENDIX E

(U) REQUIREMENTS WORKING GROUP

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**No slides were presented during the presentation.**

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APPENDIX F

(U) WARHEAD DESIGN WORKING GROUP

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# Warhead Design Working Group

March 18, 1993

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Warhead Design Working Group:  
LLNL Activities Status Report

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by  
Deborah Wojtowicz, LLNL A-Division

High Power Radio Frequency Phase 2  
Meeting # 4

Lawrence Livermore National Laboratory  
March 16-18, 1993



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The following slides are from the December HPRF Meeting.

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High Power Radio Frequency Phase 2 Study  
Warhead Design Working Group (U)

### Device Certification Issues

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APPLICATIONS (X-2)

Los Alamos  
National Laboratory

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WARHEAD DESIGN/SURETY WG ATTENDANCE

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APPENDIX G  
(U) MISSION ANALYSIS WORKING GROUP

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## STRATCOM has Supplied Information for a Cruise Missile Penetration Model



- Launch 5000' altitude
- Cruise at 2000' for most of flight
- Turn 20° or more every 60 miles
- 440 knots
- 1 missile per target

### Flight path determined by

- Target Location
- Availability of Terrain Maps
- Air defenses
- Options

Typically there will be about five cruise missiles on the  
same course for some distance

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